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ABSTRACT

This paper traces the development of the Maternal Teaching Style Instrument (MTSI) at the Demonstration and Research Center for Early Education (DARCEE). The MTSI was developed to document changes in maternal behavior; to better understand the role of maternal behavior as it influences children's cognitive growth and development and to redefine DARCEE's approach to training mothers by delineating those aspects of maternal behavior which appear to enhance the development of children's cognitive skills. A number of studies using the MTSI are reported along with validity and reliability testing of the instrument. Research results indicate a number of implications for mothers of preschoolers and those who train them. Included in this report is background information on DARCEE's early education program for low income children, the research program, and studies conducted on mother-child interactions. Appendices include directions for administration and coding of the MTSI, the scoring grid, and materials for the MTSI. (MS)

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The Development of a Maternal Teaching Style Instrument

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Background

Over the past decade, research on early education for low-income children has led to at least four important discoveries. First, it appears that children exposed to a well-organized, structured program, for at least one year prior to entry into public school, score higher on intelligence tests and other measures of cognitive functioning than similar children not exposed to preschool programs (Allegato, 1966: Bereiter & Englemann, 1968; Eisenberg, 1966; Goldstein, 1965; Gray & Klaus, 1965; Hodes, 1966; Hodges, McCandless, & Spicker, 1967; Weikart, 1967). Second, the effectiveness of preschool programs does not seem to depend upon the theoretical orientation of the curriculum employed. Programs based upon the ideas of Montessori and Piaget, programs based upon the repetitive drill suggested by Bereiter and Englemann, and those which employ a unit approach to the development of perceptual, conceptual and language skills have tended to yield equivalent outcomes (Karnes, 1969; Miller, Dyer, & Driscoll, 1969; Palmer & Rees, 1969: Weikart, 1969). Third, the results of several studies have demonstrated that residents of poor communities can be trained to act as paraprofessional teachers and can effectively implement compensatory education programs (Barbrack, 1970; Barbrack & Horton, 1970b; Gordon, 1969). There is also some support for the idea that paraprofessionals, drawn from the population receiving such programs, can train mothers to be effective educational change agents as well as, and in some cases more effectively than, professional trainers (Barbrack & Horton, 1970a). Fourth, the available longitudinal data suggest that cognitive gains associated with preschool exposure are temporary and tend to disappear a short time after the termination of the

educational program (Caldwell & Smith, 1968; Cicirelli, Evans, & Schiller, 1969; Jensen, 1969).

While it is extremely difficult to connect these findings to current developments in early education, there are several trends which seem to be emerging out of recent research in this area. The tendency of various innovative, structured, cognitively oriented preschool programs to yield equivalent results has stimulated a major shift away from massive efforts to discover "the" best preschool approach. This phenomenon has cleared the way for the investigation of other pressing issues. At present, the most prominent other issue is whether cognitive gains following preschool exposure can be made more durable. The various solutions which have been suggested seem to share the idea that the child's environment must be modified to promote continued progress. The modified environment can be considered a change maintenance system. The characteristics of one such system were set forth in a recent article by Caldwell (1967). Reviewing the literature on the effects of early environment on learning, Caldwell described an optimal learning environment as one in which a child is cared for in his own home in the context of an emotionally nurturant relationship with a mothering figure under conditions of varied sensory and cognitive input. This description serves as a workable blueprint for an environmentally based change maintenance system. It also serves to emphasize the important role of the mother in such a system.

The Demonstration and Research Center for Early Education (DARCEE) has had an appreciation for the educational significance of the mother dating back to the Early Training Project (ETP) which was initiated in 1961 (Gray & Klaus, 1965; Gray & Klaus, 1968). The ETP was a forerunner of Head Start

and was designed to determine whether a series of 10-week educational experiences would enhance the educability of preschool children from low-income homes. In this study, one group of children was exposed to the 10-week program for three successive summers and another group for two successive summers. The authors' interest in the mother fell into two primary categories. The first concern was to supplement the classroom effort by getting mothers actively interested in their children's education by teaching mothers to supplement classroom activities with activities in the home and by encouraging mothers to recognize and reward their children's progress. These mother-objectives were pursued while the child was attending the classroom program. The second concern was that the mothers help bridge the gap between summer programs so that the second summer could build on the first rather than start again from the beginning. To this end, home visitors were employed and assigned to make weekly visits to each treatment group home when school was not in session. Again, the focus was on promoting the mothers' interest in their children's development and to teach mothers to be effective educational agents in their own homes. Thus, the role of the mother as a primary agent in a change maintenance system began to emerge.

In 1966, DARCEE initiated an elaborate research project designed to investigate the vertical (or intra-family) diffusion phenomenon. The role of the mother in this endeavor was underlined by Miller (1968) who described the study's basis assumptions as: (1) the mother is the chief source of stimulation in the early years for the children in the family and is the agent who imposes the necessary order and structure upon the environment for the child's development of competence and control, and (2) the mother plays a key role in sustaining developed skills and motivating the child to

develop more complex abilities during the early years. In this study, three treatments were contrasted. The first treatment, Maximum Impact, involved both children and mothers. Mothers were trained to participate in classroom activities as small group teachers and also received home visits which were designed to help them become effective educative agents in their own homes. At the same time, their children attended the DARCEE preschool. The second treatment, Curriculum, involved the children in the classroom program but made no provision for maternal involvement. The third treatment, Home Visitor, was designed to train the mother to work at home with her children on school-like activities but involved no classroom exposure for the target child. A fourth group which received no treatment served for comparison purposes. The final report on this project is currently being revised (Gilmer, Miller, & Gray, 1970), but some of the analyses seem to indicate that diffusion from target child to younger sibling occurred only in groups where the mother was involved (Gilmer, 1969). The younger siblings in the Maximum Impact and Home Visitor groups were significantly superior to Curriculum and Comparison younger siblings on the Binet and the DARCEE Concept Test for Children. These findings corroborated the impressions of those working with the mothers. Substantial changes in mothers' life styles, particularly with respect to the manner in which mothers learned to interact with their children, were reported.

At the conclusion of this study in 1968, DARCEE research had evolved to a point where precise measurement of maternal characteristics was imperative. This investigation was undertaken for several reasons: (1) to document changes in maternal behavior, (2) to better understand the role of maternal behavior as it influenced children's cognitive growth and development

(understanding some of the mechanisms of intrafamily diffusion was an important sub-objective), and (3) to refine DARCEE's approach to training mothers by delineating those aspects of maternal behavior which appeared to enhance the development of children's cognitive skills.

The Maternal Teaching Style Instrument (MTSI) was devised by Barbrack (1970) to accomplish these objectives. Teaching style was selected as the parameter of maternal behavior on the basis of an extensive review of the literature and because the institution of effective teaching behaviors was one of DARCEE's primary training objectives.

A brief review of the literature in the area of the effects of maternal behavior on children's cognitive development is presented in the next section. In addition, some approaches to analyzing sequential behavior are discussed. Following this review, the MTSI is described. In the next section, several recent studies in which the MTSI was employed are discussed. Last, some current revisions and projected uses of the MTSI are outlined.

The Effects of Maternal Behavior on Children's Cognitive Development

Since mothers spend a great deal of time with children, particularly young children, much research has been devoted to investigating the relationship between specific maternal characteristics and the cognitive abilities of young children. Information based on the 1970 census indicated that 23 percent of all nonwhite families were headed by women, while only 9 percent of all white families were headed by women (Herzog, 1967). Many social scientists have emphasized, if not always understood, the role of the Negro mother in describing the Negro family as matrifocal.

Many early studies in this area dealt with the relationship between maternal affect and children's personality development. The maternal

antecedents of children's cognitive abilities received less attention, but were by no means neglected. Moss and Kagan (1958) reported a moderate correlation between maternal warmth and children's IQ scores. Maternal warmth, love, acceptance, and press for the child's autonomy have been consistently cited in the literature in association with children's satisfactory adjustment (Bayley & Schaefer, 1960; Bronfenbrenner, 1958; Crandall & Preston, 1955; Sears, Maccoby, & Levin, 1957). In a recent study, Baumrind (1967) refined this view by taking maternal expectations into account. In this particular study, Baumrind used an ecological observation technique to study maternal control strategies and reported that mothers who maintained high standards but who did so in a warm, positive manner tended to have competent, well-adjusted children. Similar findings were reported by Hess (undated) who made an extensive inquiry into the relationship between several maternal characteristics and children's reading readiness scores. The results indicated a positive relationship between reading readiness and mothers' tendency to be warm and supportive, as well as mothers' tendency to discipline by appealing to the inner, psychological states of their children rather than by appealing to some external normal or demanding obedience for obedience sake.

Since direct observation of mothers in action tended to overcome the inaccuracies and biases of the retrospective self-reports of mothers, recent research has tended to eschew interview and questionnaires in favor of observing mother-child interaction a la Hess. Hess, Shipman, Brophy, and Bear (1968) observed a large number of Negro mother-child pairs. The mothers were taught several block sorting tasks and then required to teach their children to perform the tasks. Mothers who taught the tasks effectively

tended to orient their children to the tasks, to present sufficient information about the tasks, to focus their children's attention on the relevant aspects of the tasks, to use specific and clear directions and to praise, encourage, and communicate expectations of success. The relative importance of maternal teaching style was demonstrated in a recent doctoral dissertation by Wiegerink (1969). In this study, four maternal variables were measured and correlated to children's measured academic aptitude. The maternal variables were socio-economic class, personality, language, and teaching style. Maternal teaching style was actually a composite of general information giving, positive feedback, and verbal questioning. The results of a step-wise correlation indicated that maternal teaching style shared more common variance (27 percent) with children's Binet IQ scores than any of the other maternal variables.

Brophy (1970) looked at Socio-Economic Status differences in amount of informational specificity mothers gave their own children and found that specificity varied not only with SES, but also with components of the task. He concluded that "in general, SES differences in parental behavior should be greatest in activities initiated and structured by parents and least in reactive situations in which the parent is responding to overt action by his child (p. 79)." Schmidt and Hore (1970) also looked at SES differences associated with nonverbal interaction between mothers and their children, and reported that physical contact was more prevalent in the low SES group than in the high SES group. However, they also discovered more glancing behavior in the high SES group, and found this behavior to be associated with a more complex level of verbal interaction. From this they argued that an environment may be impoverished nonverbally as well as verbally.

In a similar study of SES and mother-infant interaction, Tulkin and Kagan (1970) reported that middle-class mothers tended to exhibit more verbal behavior and to give more positive feedback than lower-class mothers. They did not find any differences on nonverbal dimensions.

Descriptions from these and related studies were remarkably consistent. Mothers who seemed to facilitate cognitive growth tended to be warm and accepting toward their children. At the same time, these mothers maintained high standards and conveyed these expectations to their children. In teaching their children, as well as in generally mediating the environment for them, these mothers tended to spend time preparing their children to receive information, to focus their attention on relevant situational aspects, and to motivate their children by means of encouragement and approval. These mothers were clear and specific in giving directives, but seemed to have the ability to deal on an abstract conceptual level. They tended to stimulate thinking by frequently asking questions and by employing other forms of verbal interaction.

Most training programs for low-income mothers have employed one or more of these characteristics as objectives. There appears to be ample evidence to support the need for this training.

Bayley and Schaefer (1960) reported that middle-class mothers verbalized warmer, more accepting and more permissive attitudes toward their children, while lower-class mothers were typically more dominating and punitive. Walters and Crandall (1964) used the Fels Parent Behavior Scales in a longitudinal study and reported that maternal coerciveness was associated with SES. Higher SES mothers were described as significantly less dictatorial in their attempts to influence their children's behavior. Klatskin, Jackson,

and Wilkin (1956) studied maternal attitudes and child-rearing practices and reported that lower-class mothers were more inconsistent than middle-class mothers in dealing with their children.

Direct observation of mother-child interaction has produced similar findings. Walters, Connor, and Zunich (1964) found marked differences when lower- and middle-class mothers were contrasted over as series of studies. In these studies, lower-class mothers were found to use fewer contacting, directing, structurizing and teaching responses and more remaining out of contact responses than their middle-class counterparts. Kogan and Wimberger (1968) observed the verbal and nonverbal responses of mothers from two socio-economic groups interacting with their children. The observational data indicated that a small group of Head Start mothers were less agreeable, made fewer suggestions, gave more direct orders and were more unfriendly and impersonal when giving commands than a small group of middle-class mothers. These findings were corroborated in a recent study by Bee, Van Egeren, Streissguth, Nyman, and Lechie (1969). Both structured tasks and an unstructured waiting room situation were employed to permit direct observation of the interaction between mothers and their preschool children. The results indicated that middle-class mothers allowed their children to work at their own pace, helped structure tasks to facilitate their children's ability to solve problems, and gave appropriate positive feedback. Lower-class mothers, on the other hand, were described as intrusive to the point of doing things for their children, were more negative and restrictive, and used more controlling and disapproving statements to their children.

A comparison of the characteristic mood and manner of mothers who seem to facilitate cognitive development and those characteristics which describe

low-income mothers indicated that many low-income mothers did not function to promote cognitive development. This premise and the empirical evidence which undergirds it, as well as an appreciation for the potential of the mother qua educative agent, was the primary rationale for including a mother training component in the DARCEE program. The MTSI was developed at DARCEE to assess maternal teaching behavior. The development of the MTSI owes much to the work of Hess and his colleagues, but is quite distinct from the procedures used by that group. Most of the MTSI's response categories were a priori constructions based on the literature but several were added after the experience of scoring of almost 100 early protocols.

Various methods of both coding and observing behavior have been used in recent years. For example, Henker, Asano, and Kagan (1968) described a system for presenting visual stimuli to infants which used a slide projector and a television monitor. They suggested that their apparatus could easily be adapted to video tape equipment. Finally, they noted some benefits of having a permanent record (e.g., video tape) of behavior; for example, the possibility of postponing coding to a more convenient time, and the possibility of applying more than one coding system to a behavior sequence. Kagan (1968) also outlined a number of studies involving SES differences including a study of mother-infant interaction in which maternal behavior was coded wholistically--e.g., "Mother picks up child." The units were not mutually exclusive and were recorded at 10-second intervals. Halverson and Waldrop (1970) used video tape and a modified Bales Interaction Analysis (Bales, 1950) in a study of "maternal behavior towards own and other preschool children (p. 839)." They found maternal behavior to be consistent with both own and other children, but that mothers tended to be more negative with

their own children. Halverson and Waldrop were only concerned with verbal data as evidenced by the categories used: (1) positive, encouraging statements; (2) negative, controlling statements; (3) total words; (4) total statements. They suggested that the concept of "ownness" should be taken into account when dealing with mother-child interactions. Lewis (in press) applied a Markovian model (see, for example, Kemeny & Snell, 1960) in a study in which he observed the interaction of mothers and infants at 10-second intervals. He used a "density measure" which related the number of infant behaviors of a certain type made by the child alone to the number of such behaviors made when the mother was simultaneously interacting with the child. Boismeier (1970) applied a similar Markovian analysis in a study of transitions of infants from one state to another. Longabaugh and Roth (1969) have a more detailed review of methods of studying interaction sequences and of the application of formal mathematical models to categorical data in their study of naturally occurring interactions of schizophrenic patients. They approached interactions as information and attempted to predict interactions from context through the application of multivariate uncertainty statistics.

The Maternal Teaching Style Instrument

The MTSI was designed to permit direct observation of mothers teaching their children. The original MTSI consisted of 10 display cards. On most of the cards, there were pictures of three geometric forms. Accompanying each card were three rubber forms which corresponded to those shown on the card. The geometric forms varied in terms of color, shape, size, and position on the card.

According to the original plan, only the mothers' responses were rated. At first a tape recorder was used to record the mothers' verbalizations.

Rating of the mothers' verbalizations was done sometime after the actual performance of the task. The verbal categories included: Cue Label, Direction, Positive Feedback, Negative Feedback, Question, and Information. Trained observers rated the mother's nonverbal responses on the spot. Nonverbal responses were broken down into two broad categories. Gesture and Physical Contact and each of these was again broken down into: Direction, Positive Feedback, and Negative Feedback.

This rating procedure was modified and markedly improved by the introduction of video tape equipment. This method of data gathering precluded the need to rate nonverbal responses during the session.

The MTSI--Recent Studies

A preliminary version of the MTSI has been used with some success in several recent DARCEE studies. In 1970, Barbrack reported the results of a study designed to investigate the effects of three home visiting strategies on first grade children's academic aptitude. In the first group, Mother Involved - Cognitive, the home visitors actively solicited mothers' participation in the sessions. The content of the program was cognitively oriented and designed to supplement the first grade curriculum. In the second group, Child Centered - Cognitive, the home visitors worked only with the child. The content of the sessions was the same as for the first group. In the third group, Mother Involved - Physical Training, the home visitors actively solicited mothers' participation, but the content was designed to teach the child a variety of gross motor skills. On the basis of Binet and Metropolitan Achievement Test scores, it was concluded that the Child Centered - Cognitive approach was most effective. The MTSI data, however, presented a different picture. The only significant differences in maternal teaching

style favored mothers in the Mother Involved - Cognitive group. These mothers were superior in Information giving, Nonverbal Positive Feedback and Overall Positive Feedback responses. The disparity between the effects of treatment on children and the effects on mothers would have been obscured had the MTSI not been used. This disparity led the author to speculate that modifications in maternal behavior may have a "sleeper effect" and not influence children in a detectable manner until sometime after the termination of intervention.

An abridged version of the MTSI was used in two other home visiting projects (Barbrack & Horton, 1970, 1970a). In these studies, only the last four MTSI cards were used and only the mothers' verbal responses were recorded and rated. In one of these studies (1970a), three home visiting programs, varying in terms of the professional qualifications of the home visitors, were compared. The MTSI was not only sensitive in distinguishing treatment group mothers from comparison group mothers (the former were found to be more positive and specific, and less negative), but also discriminated among treatments. The MTSI data indicated that mothers who were trained by paraprofessional home visitors, who were in turn supervised by paraprofessionals, emitted a greater number of feedback responses in proportion to directions than mothers trained by a professional teacher and mothers trained by paraprofessional home visitors who were supervised by a professional teacher. These findings were useful since each related to an objective of the training program. Again, this information would have been lost had the MTSI not been available.

The next studies employing the MTSI used video tape equipment. Viewing several mothers on video tape indicated that the original response categories

needed to be revised. As a result, several new categories were added and some of the original category definitions were refined.

An abridged version of the MTSI (Card #7 for practice and Cards #8, 9, 10 as test cards) was last used in a DARCEE project in which two approaches to mother training were compared. The primary objective of this study was to compare the efficacy of two approaches to the modification of mothers' interracial attitudes. A sub-objective was to modify the manner in which mothers interacted with their preschool children.

In this study, the mothers of the children in the DARCEE classroom were assigned to one of two treatment groups. The first group received an experiential treatment in which informal, non-didactic discussions took place. This treatment attempted to encourage close and intimate interactions. The mothers took part in the DARCEE classroom, but worked with children other than their own. The second group received an informational treatment with formal, didactic lectures. Mothers worked with their own child in the classroom, and interaction was discouraged.

The MTSI posttest results showed that treatment groups were superior to the comparison group in Cue Label I and Cue Label II and Verbal Positive Feedback responses. In addition to being sensitive to treatment effects, it was interesting to find that the MTSI responses reflected changes from pretest to posttest for all mothers tested. There was a significant Trials effect (pre post) for Verbal Negative Feedback, Verbal Direction, Gesture Direction and Physical Behavior Management. The authors of this study (Barbrack & Gilmer, in preparation) argued that the decrease in maternal responses from pretest to posttest was in proportion to the child's increased abilities, i.e., the greater the capability of the child, the less the need for maternal intervention.

It appears that measuring the effects of treatment on mothers in training has been partially accomplished. This is particularly true for positive and negative feedback responses and for Cue Labelling responses. This makes sense inasmuch as DARCEE's approach to training mothers tends to concentrate on getting mothers to be more positive and less negative, and also to get mothers to focus their children's attention on significant features of the environment. DARCEE's approach to training mothers also emphasizes information giving and questioning. The fact that these response categories had not previously reflected treatment effects or developmental changes appeared to be due to the nature of the MTSI rather than to DARCEE's failure to promote increases in the frequency of these maternal responses. Beginning in September, 1970, the MTSI was revised (under the auspices of the Appalachian Regional Commission) with this in mind.

To date, the MTSI findings have not made substantive contributions to DARCEE's approach to training mothers. Several possibilities had been suggested which required new methods of handling the MTSI data. A rating system which records maternal responses in sequence has been seen as a necessary step in observing mother-child interactions. Such a sequential rating system has been devised and has been used in recent studies (after September, 1970).

Method

The MTSI was administered to 16 black mother-child pairs and to 19 white mother-child pairs. A white female tester was used to administer the instrument to the subjects according to the instructions in Appendix I. All sessions were videotaped, and the responses then coded (by Sandler and Stewart) from all of the task cards onto the scoring grid described in Appendix II. A separate grid was used for each task and the tasks were administered in the

same order for all of the subjects. Reliability estimates were established with the use of tapes from a previous study, and from the coding of the first task (which was designated as a practice card). From the coding, frequencies were tabulated for a contingency table giving a Predecessor-Successor Sequence for each behavioral unit through the use of a computer program (written by Sandler for this study). The program tabulated the number of times each category of the coding scheme followed every other category, and the number of times each category preceded every other category; for example, it counted how many times a gesture followed an Appropriate Direction. The data were analyzed for the entire group of 35 mother-child pairs, and also along the dimensions of race (Black/White) and IQ of the child (above/below the mean) on the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) Full-Scale IQ. Chi-squares were calculated along both dimensions to determine whether there were significant differences in the patterns of responses of the groups described above.

Results and Discussion

One indication of the feasibility of gathering information on maternal teaching style through the use of structured tasks and the sequential coding scheme developed in the course of this project was the amount of inter-rater agreement which was found. The product-moment correlations between raters in some pilot work on the coding form involving video tapes from a study done prior to this project ranged from 0.77 to 0.85. The correlations between raters on the practice card used in the present study ranged from 0.81 to 0.99 across categories. This card was used since it seemed to represent a pure trial for the raters in that they had not yet gotten used to the particular style of the mother.

In order to demonstrate validity for the MTSI, the subjects were split according to race (Black/White) and IQ (High/Low) of the child. The mean IQ of 78 was used to assign subjects to the IQ groups. Chi-squares were computed across total responses to each of the categories in order to determine whether the MTSI could distinguish between the groups defined above. Significant chi-squares were obtained between the 16 Black and 19 White Ss ($X^2 = 195.96$, $p < .01$) and the 19 High and 16 Low IQ Ss ($X^2 = 265.91$, $p < .01$). These results will be discussed below.

First, some general characteristics of maternal teaching style will be discussed for all the Ss combined; and then will follow a further discussion of the group differences outlined above. There were a total of 3294 responses coded for the 35 Ss on all four trial cards (excluding the practice card); thus, there was a mean of 94.1 responses per subject. The majority of these responses fell under one of two rubrics--Appropriate Direction, and Cue Labels (Size, Shape, Color, and Position). There were 915 Appropriate Directions, accounting for 27.7 percent of the total, and 858 Cue Labels, accounting for 26.0 percent of the total, coded for these subjects. Since most of the Cue Labels were included in Direction-statements, it can easily be seen that this combination (Appropriate Direction containing a Cue Label) accounted for a significant part of the mothers' behavior. Also, both positive and negative task-oriented feedback occurred about equally often, with positive feedback accounting for 8.0 percent and negative feedback accounting for 7.4 percent of the total number of responses. Finally, gestures seemed to play a large role in the mothers' repetoire of behaviors with a total of 444 recorded (13.4 percent)--of these, 283 accompanied a direction (8.5 percent of the total responses, and 63.5 percent of the number of gestures).

Table I contains frequencies and percentages for each category. In general, it would seem that the mothers used directions containing Cue Labels and accompanied by gestures as the mainstay of their teaching style, and that they did not emphasize either positive or negative feedback.

TABLE I

Frequencies and Percentages of Responses on the MTSI

Category	Frequency	Percentage of the Total
1. Appropriate Direction	915	27.7
2. Inappropriate Direction	37	1.1
3. Appropriate Question	48	1.4
4. Inappropriate Question	128	3.8
5. Appropriate Information	139	4.2
6. Inappropriate Information	24	0.7
7. Positive Child-Related Reinforcement	5	0.1
8. Negative Child-Related Reinforcement	18	0.5
9. Positive Task-Related Reinforcement	268	8.0
10. Negative Task-Related Reinforcement	244	7.4
11. Gesture	444	13.4
12. Physical	166	5.0
13. Color	216	6.6
14. Shape	94	2.9
15. Size	25	0.7
16. Position	523	15.9
TOTALS	3294	99.9

After a significant chi-squared value was found for the dimension of IQ of the child, the various categories were examined in order to see where the two distributions of responses differed. The assumption was that the mothers of the High IQ group[1] were doing something right and were contributing to the

[1]Mothers of the High IQ group will be referred to as the High IQ group. Similarly, mothers of the Low IQ group will be referred to as the Low IQ group.

intellectual development of their children. The pattern of differences seemed to indicate that the High IQ group gave more information to their children than did the Low IQ group (76 responses vs. 49 responses). Furthermore, the High IQ group used many more Cue Labels (another form of information) than the Low IQ group; for example, Position (266 vs. 182), Color (127 vs. 64) and Shape (57 vs. 26). In addition, the High IQ group seemed to use Cue Labels in combination (e.g., "big blue circle"); while the Low IQ group used them one at a time (e.g., "the blue one"). The High IQ group also gave more positive feedback (218 vs. 184) and less negative feedback (53 vs. 104). The data on both cue labels and feedback confirm earlier work in this area by Barbrack (personal communication).

Finally, the data on the categories of Gesture and Physical were in line with Schmidt and Hore's (1970) results on SES differences in maternal teaching behavior. Mothers in the High IQ group made more gestures (218 vs. 184) but fewer physical contacts (53 vs. 103) than mothers in the Low IQ group. This result lends support to Schmidt and Hore's suggestion that an environment may be impoverished nonverbally as well as verbally.

The categories were also examined in light of the significant chi-square value on race to determine the nature of the differences. The differences along this dimension were not necessarily the same as those along the IQ dimension discussed above. For example, while the H/L split on IQ yielded a difference on amount of information given, the frequencies for the B/W split were almost identical (63 vs. 64). There were, however, differences in favor of the White mothers on the use of Cue Labels for Position (218 vs. 256), Color (86 vs. 109), and Shape (30 vs. 54), but not for Size (10 vs. 14). The Black mothers seemed more critical of their children in both the categories

of child related negative feedback (15 vs. 2) and task related negative feedback (289 vs. 130). Finally, the Black mothers also seemed to give more inappropriate information (19 vs. 4) and ask more inappropriate questions (95 vs. 28) than the White mothers.

The results would seem to indicate that mothers of preschool children can best improve their teaching techniques by emphasizing the following points: (1) concentrating on giving their children more information about tasks, even when such information in redundant; (2) emphasizing the importance of the use of Cue Labels (another form of information, e.g., see Brophy, 1970); (3) giving more positive feedback and less negative feedback (e.g., see Tulkin & Kagan, 1970); and (4) accompanying their directions with gestures (another form of information, e.g., see Schmidt & Hore, 1970).

Implications

The results of the present study would seem to have important implications not only for the mothers of preschoolers, but also for those who train the mothers of preschoolers. For example, the ARC trains Family Day Care Workers (FCDW's) to work in areas where the educational change agents (i.e., the mothers) and the recipients of the services (i.e., the children) tend to be widely scattered and, in many cases somewhat inaccessible. There are logistical difficulties inherent in the use of video-tape for observing behaviors in the homes. It is possible, however, to use the scoring grid developed in this study without video-tapes. Current DARCEE studies are using it in this manner. Given this possibility, the MTSI would play an important role in the future evaluation of programs dealing with educational change agents--even when it is not possible to bring them into a laboratory setting.

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Appendix I

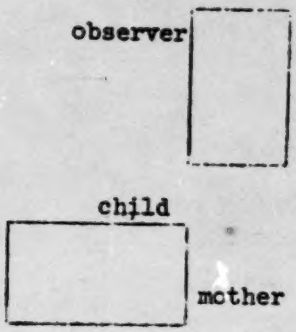
Directions for Administration and Coding for the Maternal Teaching Style Instrument

Directions for Administration

1. Procedure

a) Arrange all cards and corresponding figures on table at Observer's left.

b) Seat mother and child at other table (child should sit adjacent to mother on her right if she is right-handed, on her left is she is left-handed).



c) Hand trial card to mother, and say:

(mother's name), you and (child's name) will do this together. You are to help (child's name) fix his card so that it will match your card.

You may help him in any way to fix his card to look like yours so long as you do not show him your card. Make sure he does not see your card.

d) Place trial card on the table in front of the child, and place the corresponding figures in a random order next to the top of the card, saying to the child:

(child's name), this is your card. Here are your blocks. You may begin as soon as mother tells you to do so.

e) The observer should not attempt to modify the mother's task style, unless the mother clearly does not understand the task. For example, a mother may do the task herself by placing the figures on the card. This technique may be an important part of her teaching style. In this case, the instructions should be repeated only at the beginning of each card.

A mother may ask the observer a question about the task. For example: "Am I supposed to do it, or is my child?" In this case, the observer should modify the relevant instruction by changing the wording and say something like: "You may help (child's name) any way you want to get his card to look like yours."

Directions for Administration, cont'd.

f) There is no time limit on the task, and the observer should approach and take away the materials only after the mother indicates that she is finished.

g) Repeat this procedure for each of the remaining cards.

2. Coding

a) Coding is done on the MTSI scoring grid (see next page).

b) For each observed behavior, the sequential number of that behavior is placed in the appropriate box of the scoring grid.

For example, if the mother begins with an appropriate question, then an appropriate information statement, and then an appropriate direction, the coder would place a 1 in the appropriate question box, a 2 in the appropriate information box, and a 3 in the appropriate direction box.

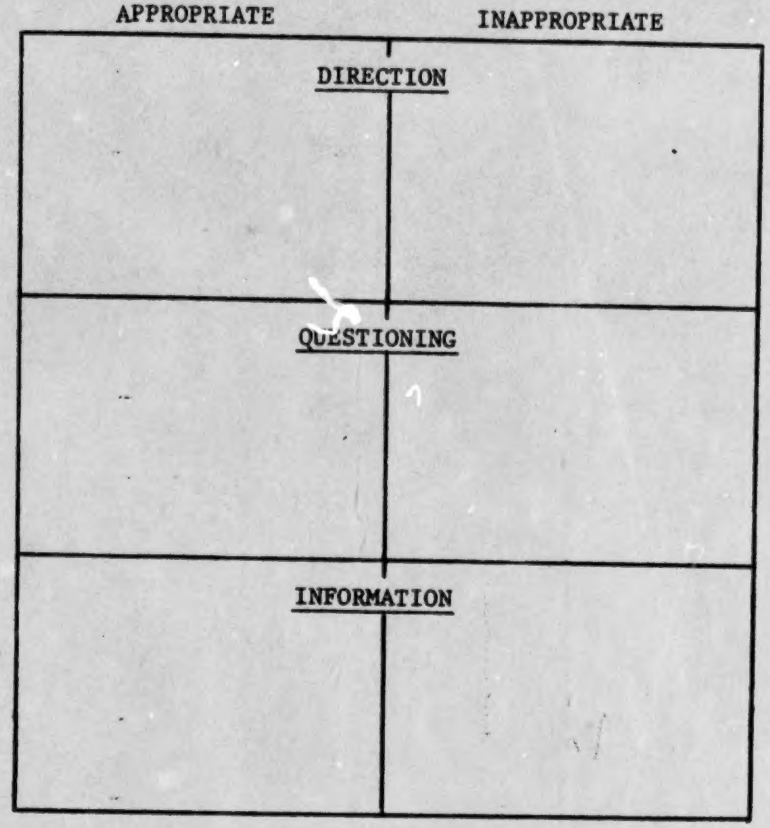
This numbering in sequence of behaviors is continued until the mother finishes the task.

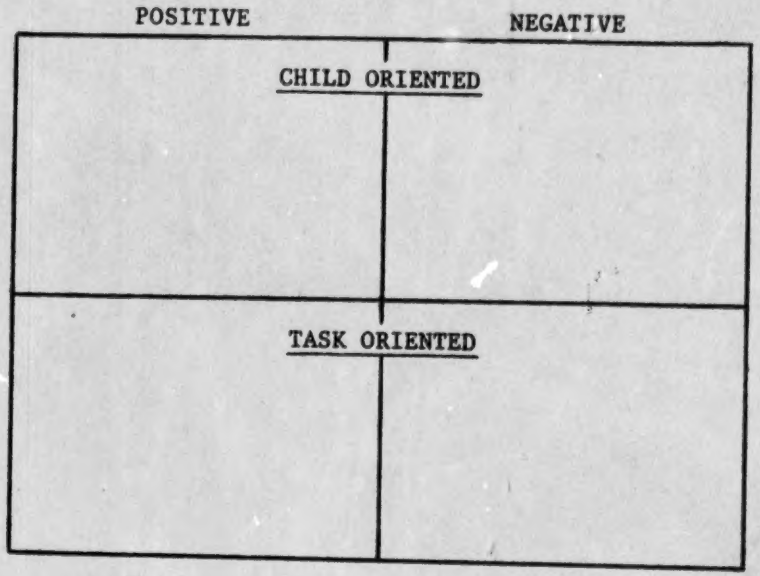
c) Should the coder lose count during coding, it is easy to continue coding. If, for example, the coder loses count somewhere in the forties, he may continue to code by using numbers above 50 or 60. In this way, there will be a discontinuity in the numbers on the scoring grid, but the sequential information will be preserved.

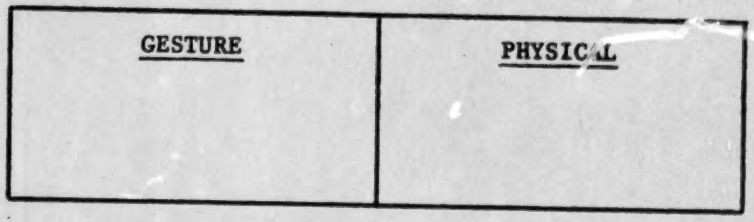
Appendix II

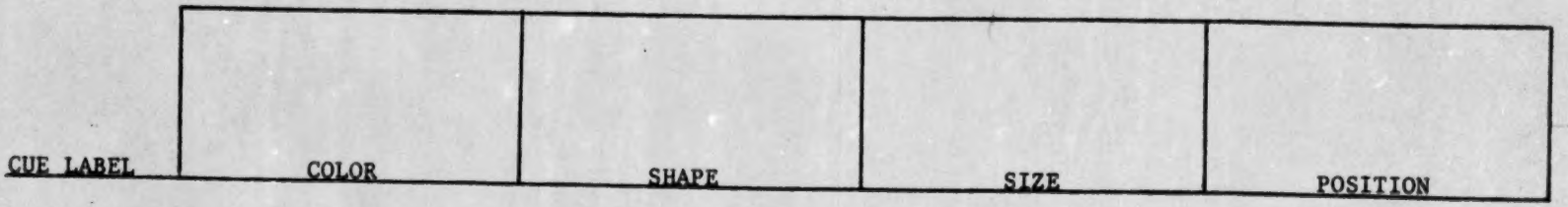
Maternal Teaching Style Instrument
Scoring Grid

The following scoring grid allows the sequential numbering of observed Maternal Teaching Style behaviors, either from Video tape or from actual observation.


APPROPRIATE
INAPPROPRIATE
DIRECTION
QUESTIONING
INFORMATION


POSITIVE
NEGATIVE
CHILD ORIENTED
TASK ORIENTED


GESTURE
PHYSICAL


CUE LABEL
COLOR
SHAPE
SIZE
POSITION

Appendix III

Unitization

Unitization

In order to code behavior, units of response had to be established. These units must make meaningful distinctions between responses, and must do so reliably. It is an added advantage if these rules of unitization are easily taught to raters. For verbal behavior, the sentence unit seems to satisfy these requirements. A sentence usually contains a meaningful bit of information, and it is relatively easy to train raters to distinguish between sentences. The sentence unit is used in all verbal categories except Cue Label (see Appendix 1). A Direction, for example, is an imperative statement with which the mother instructs the child to do something with the test materials. Repetitions, such as, "Pick it up", "Pick it up," are scored as one direction for each sentence--in this case two directions are scored.

Word or phrase units are used for the Cue Labels. Color, shape, or size could be indicated by one word, and would usually be contained in a Direction, Question, or Information. Position could be indicated by one word or a phrase: "in the corner, in the corner" is scored as two position Cue Labels.

For non-verbal behavior, there is no easily identified unit as there is for verbal behavior. It is necessary, then, to select meaningful boundaries to limit and define one non-verbal response. The unit should not be so global as to lose meaning, but should not be so specific as to inflate the number of responses that need to be coded. The non-verbal unit for this task is roughly analogous to the verbal sentence and is called a completed action. Completed actions can take place in two contexts: 1) Gestures, which are physical movements by the mother in which she does not touch the child or the materials, and 2) Physical units, in which the mother actually touches something in the context of the task.

A Gesture is bounded at its beginning and its end by a rest position. A good example is a shrugging of shoulders. Before the movement, the shoulders are at rest. The shoulders then move up, and lastly return to a rest position. This is scored as one Gesture. Gestures often accompany verbal units, as when the mother says "no" and vigorously shakes her head. A Gesture is scored whenever the mother makes a completed action (pointing to a block, shaking her fist, etc.) whether or not it accompanies a verbal unit. Repeated Gestures are scored as more than one Gesture only when there is a rest position (holding the card, putting hand down on table, etc.) between them.

Physical units are much easier to code. One Physical unit is scored for each time the mother touches either the child, or the task materials. If the mother picks up each of the three blocks and successively places them on the card, she is scored with three physical units. Complete descriptions of all categories are given in Appendix 1.

Appendix IV

Maternal Teaching Style Instrument
Category Descriptions

I. Verbal Responses

a) Direction will be scored whenever the mother verbally instructs the child to do something with the test materials with an imperative statement. A Direction is composed of two elements: 1) an instruction to pick up a figure ("Pick up the blue square") and 2) an instruction to place the figure on the card ("Put it in the right-hand corner"). One Direction will be counted when either one or both of these elements are given by the mother. If a mother repeats an element, however ("Pick it up," "Pick it up"), she is given a score for each repetition. The unit for a Direction is a sentence.

1). Appropriate Direction will be scored when a direction is specific and task-directed. This direction must be suitable to the completion of the task, and must sound to the coder that it contains enough information and is reasonable enough for the child to follow it. For example, "Push the triangle to the top" would be an Appropriate Direction, while "Do it right," or "Make it pretty" would not.

2). Inappropriate Direction will be scored when an unreasonable demand is made upon the child; when it is impossible for him to follow a direction because of its lack of specificity or information. "Do it right," "Make it pretty," and "Push it around" are examples.

b) Questioning will be counted whenever the mother asks a question of the child. The unit is a sentence.

1). Appropriate Questions are those which focus the child's attention on information which is necessary for the successful completion of the task. These questions must be directed toward information which it is possible for the child to know. Examples are "Do you know what color that is?", and "Which one is the star?".

2). Inappropriate Questions are those which call upon the child to draw upon information which he cannot reasonable be expected to have, or those which are irrelevant to the successful completion of the task. Inappropriate Questions are of this type: "Is it right?" and "Do you like ice cream?".

c) Information will be counted whenever a declarative sentence is used by the mother to enrich or add to the test experience of the child. Information usually deals with specific attributes of the task materials along the dimensions of color, size, shape, position, sameness-difference, etc. The unit is a sentence.

1). Appropriate Information is related to the task and gives him inputs which should help him to follow directions leading to the successful completion of the task, but it should not be related to the child's actual test performance. "This is a triangle," or "Purple is the color of grapes" would be appropriate information responses.

2). Inappropriate Information is either incorrect or is unrelated to the task or materials, such as "This is taking a long time."

d) Child-Oriented Feedback will be scored whenever the mother responds verbally about the child but not about his performance on the task.

1). Positive Child-Oriented Feedback will be scored whenever the mother responds with positive affect to the child about the child, whether or not this response is a result of his task performance. For example, "You're a good boy" would be a Child-Oriented Positive response. The unit is a sentence.

2). Negative Child-Oriented Feedback is scored when the mother responds with negative affect to the child about the child, as in "You're a bad boy."

e) Task-Oriented Feedback is scored when the mother responds verbally to the child about his performance on the task, not when she makes global affective statements about the child. The unit is a sentence.

1) Positive Task-Oriented Feedback is counted when the mother responds verbally to the child about his task performance with positive affect ("You did that very well").

2) Negative Task-Oriented Feedback is counted when the mother responds verbally to the child about his task performance with negative affect ("No, you're doing that wrong").

f) Gesture is coded whenever the mother uses a bodily movement without actually touching the child or the task materials. These movements may impart information to the child, or to respond favorably or unfavorably to the child or his performance. The unit is a completed action: from a state of rest to a gesture to a return to a state of rest. One Gesture would be a shaking of the head or pointing to a block.

g) Physical is coded whenever the mother actually touches the child or the task materials. This may be in a variety of contexts, such as moving the blocks while modeling for the child, behavior management of the child, or expressing positive or negative affect to the child. The unit is one touch: Touching three different blocks or one block three times would be scored as three Physical units.

h) Cue Label is coded whenever the mother accurately uses a word or phrase to describe the figures or the card to the child. The unit is a word for Color, Shape, and Size, and the unit for position is a word or a phrase.

1). Color is coded each time the mother accurately uses a color name. "Pick up the big blue triangle" would initiate one unit score in the Color box of the scoring grid.

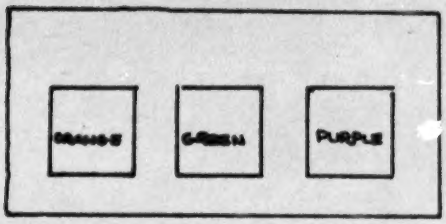
2). Shape is coded each time the mother accurately uses a shape name. "Pick up the big blue triangle" would initiate one unit score in the Shape box of the scoring grid.

3). Size is coded each time the mother accurately uses a size name. "Pick up the big blue triangle" would initiate one unit score in the Size box of the scoring grid.

4). Position is coded each time the mother specifically and accurately identifies an area of the card, either with herself, the child, or the figures as referents. Put the triangle in the corner, near the blue square would initiate TWO unit scores in the Position box of the scoring grid. The unit for Position is a word or a phrase.

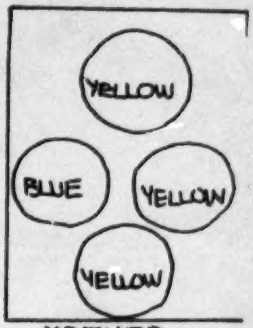
Appendix V

Maternal Teaching Style Instrument Materials



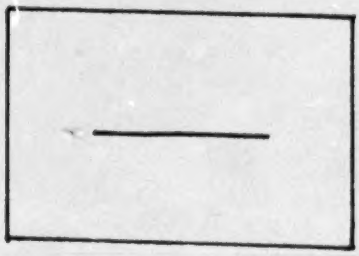
CARD 1

CHILD



MOTHER

CARD 2



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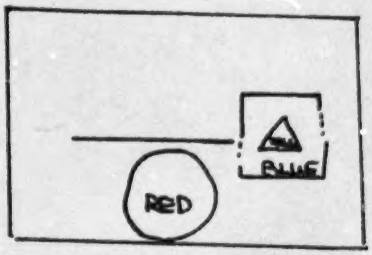
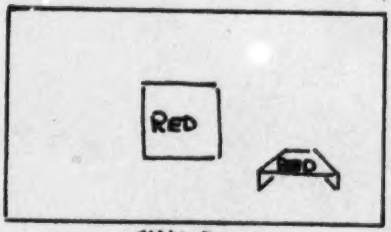


MOTHER

CARD 3



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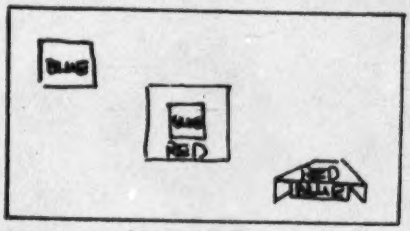
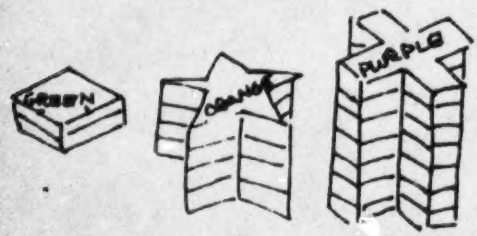
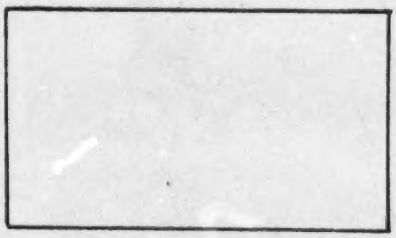


MOTHER

CARD 4





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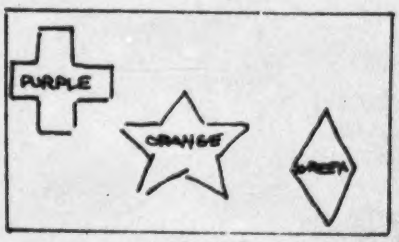

MOTHER